latterly pulverized coal has been employed. These various fuels require furnace modifications, mainly in tl\e ports and heads, as only the air supply is preheated.

Pulverized coal is only suited for use in furnaces where the ash carried into the furnace with the fuel will not be objectionable. One trouble with early open-hearth or Siemens furnaces was caused by the dirt carried over into the regenerators. This was particularly the case when the chambers were located immediately below the furnace and the uptakes rose directly from the chamber arch. In later designs the chambers were placed below the charging platform and the uptakes were carried up from a cinder pocket or slag chamber. This reduced, but did not eliminate, the cinder trouble.

The carrying power of a flowing stream varies as the sixth power of its velocity; that is, when the velocity is doubled, the mass of the particle which the stream can carry increases sixty-four times. The inertia of these larger particles tends to carry them into any eddies where the stream changes direction, but the finer particles will be carried farther. The ports must be inclined and the velocity of the flame must be sufficient to allow the bottom to be made. This also tends to direct the flame on the surface of the bath and the higher the impinging velocity the greater the tendency to pick up cinder, etc., which will be thrown up during the boil.

Possibly--the best illustration of the action of the jet of flame impinging upon the top of the bath may be obtained by observing the action of a stream of water from ai nozzle impinging upon a flat plate'.; When the stream is directed at right angles to the plate there will be a circular flare or - film of water traveling outward at a high velocity and a short distance out a tumultuous ring of eddying w^ter eight or teii times as thick as the film it surrounds. The distance out to this ring will depend upon the velocity of the stream. When:the jet strikes the plate at an angle it .will form a triangular high-velocity film breaking up into a -turbulent eddy at the base or side furthest from the apex where-the siiream strikes the plate. The distance from the stream to the eddy will be affected by two factors, the velocity of the stream and its angle of incidence. If a water surface is

substituted for the flat plate the action is complicated by the fact that-the jet displaces a certain amount of the surface water